# North American Green Erosion Products Overview

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## North Central Regional Manager

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# Erosion Control Blankets (ECBs)

# Turf Reinforcement Mats (TRMs)

# Hydraulically Applied Mulches

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# Erosion Control Blankets (ECBs)

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# Types of Erosion Control Blankets

- Straw- 2 to 12 Months
- Wood fiber- 2 to 36+ Months
- Straw Coconut Blends- 24 Months
- Coconut- 36 Months
- Coir- 36+ Months
- Jute- 12 to 24 Months

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# Erosion Control Blanket Net Options

- Short Term Rapid Degradable (2 Months)
- Short Term Photodegradable (12 Months)
- Extended Term Heavy UV Stabilized (24 Months)
- Long Term Heavy UV Stabilized top & bottom nets (36 Months)
- Bionet (12 to 24 Months)
- Netless

# Where and Why Use ECBs

- Where land disturbing activities take place
- Where erosive forces exceed limits of vegetation alone

# How ECBs Work

- ECBs provide erosion protection prior to vegetation
  - Reduce runoff velocity
  - Improves infiltration
  - Reduce soil detachment
  - Absorb raindrop energy
  - Trap soil particles

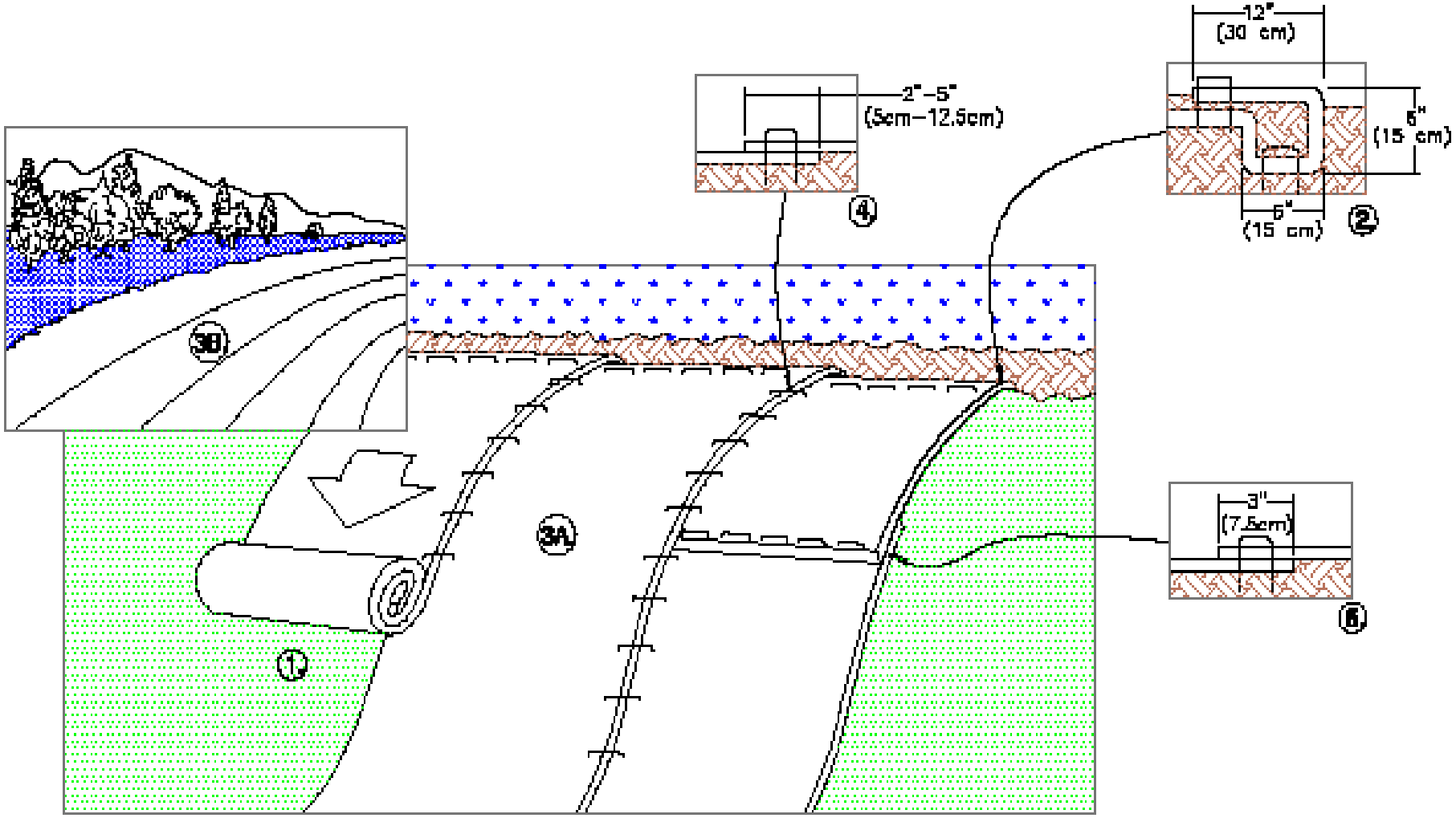
# How ECBs Work

- Organic matrix acts as mulch to enhance germination
  - Improves soil moisture retention
  - Regulates soil temperature
  - Supports young plants

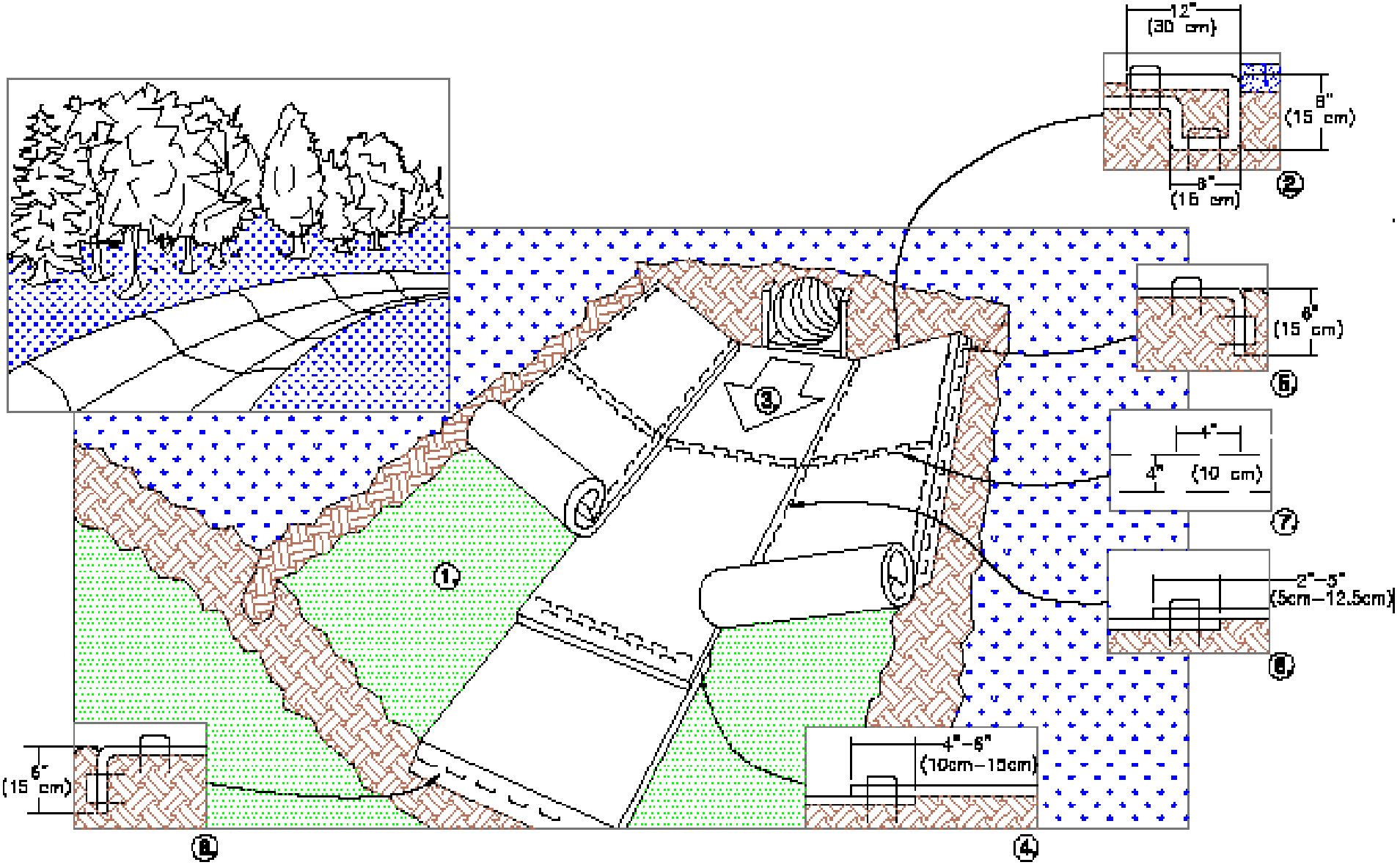
# General Installation Guidelines

1. Prepare the seedbed by raking, seeding and applying fertilizer
2. Use trenching procedures to secure terminal edges
3. Keep material in contact with the soil
4. Place staples in appropriate locations using specified staple pattern
5. Secure all product overlaps
6. Ensure seams are shingled to prevent undermining

# Slope Installation



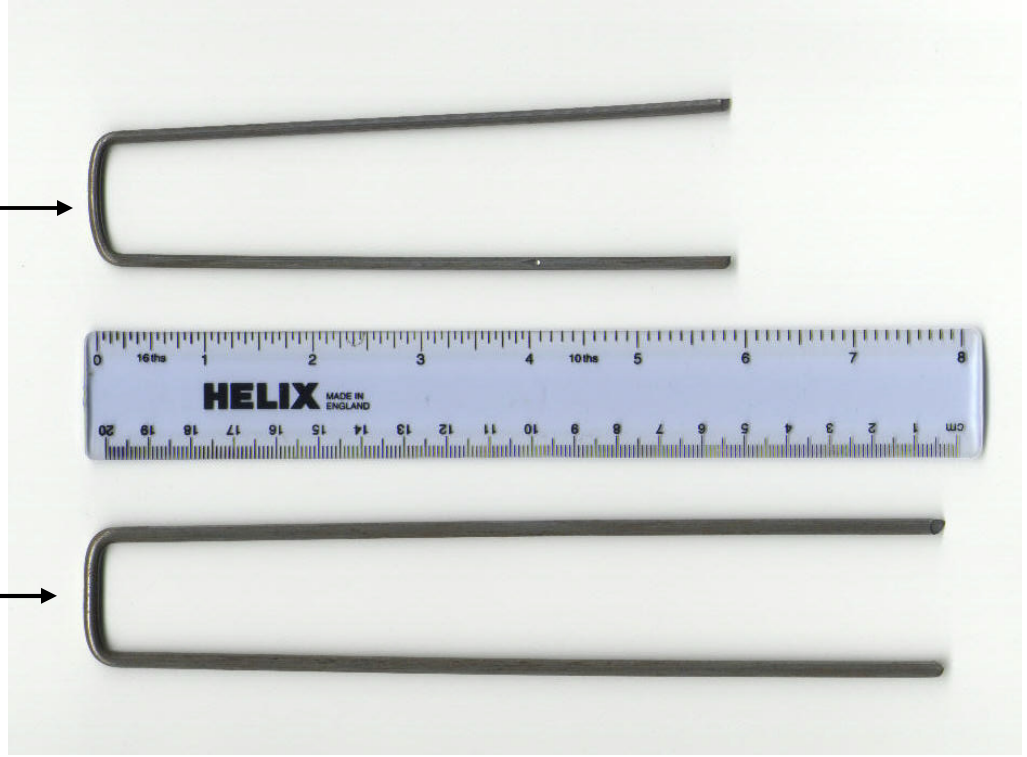
# Channel Installation



# Anchors

**ECBs generally use 6”x 1”x 6”**
**11 Gauge U shaped Staples**

**TRMs generally use 8”x 1”x 8”**
**9 Gauge U shaped Staples**



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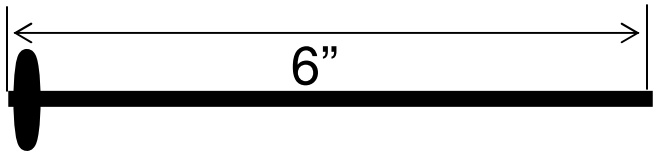
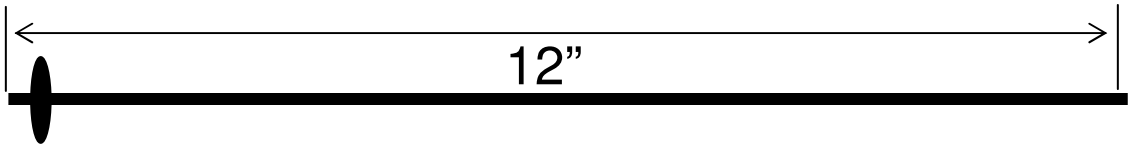
# Anchors

**For hard or rocky soils, heavy duty 6” nails with washers can be used to anchor TRMs**




**For sandy soils 12” or 18” geotextile pins with washers may be used**

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# Short-Term ECBs

- **Short-Term  up to 1 year**
  - **Rapid degrading**
  - **Photodegradable**
  - **Biodegradable**

**Straw**

# Rapid Degrading ECBs

- Single net, 100% straw matrix
- Top & bottom net, 100% straw matrix
- Rapid degrading thread
- Functional longevity up to 2 months
- Ideal for high maintenance areas

Straw

# Short-Term Photodegradable

- Single net, 100% straw
- Double net, 100% straw
- Up to 12 mo. functionality
- Netting & thread are photodegradable

**Straw**

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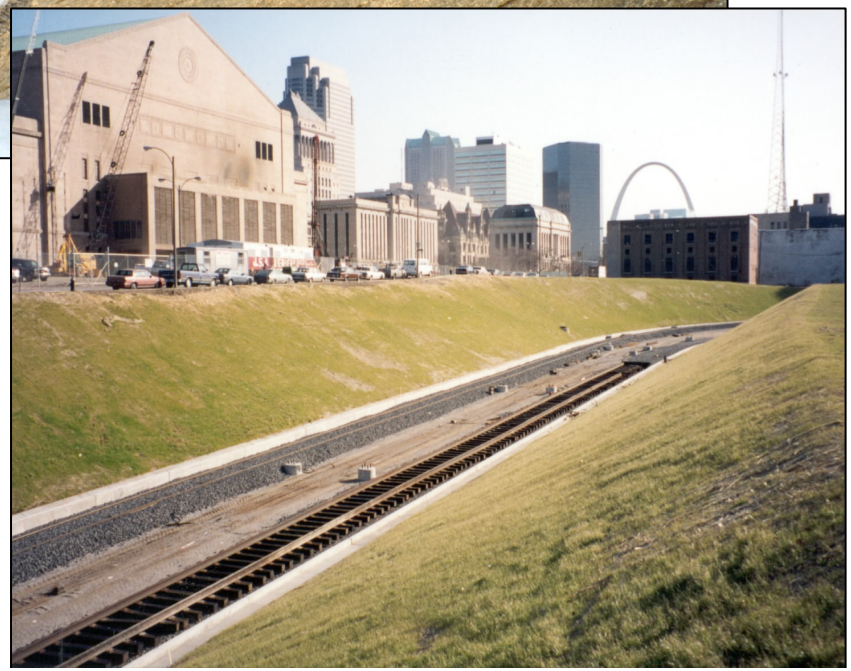
# Single & Double-Net Straw Blankets



# BioNet Applications

# Extended & Long-Term ECBs

- SC150 & C125 nets & thread are photodegradable with straw and/or coconut fiber

- SC150BN & C125BN biodegradable nets & thread with straw and/or coconut fiber

# Extended-Term

Straw & Coconut

- **Heavyweight UV stabilized top net, lightweight bottom net**
- **70% straw/30% coconut fiber matrix**
- **Functional longevity up to 24 months**

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# Long-Term

Coconut

- Heavyweight UV stabilized top & bottom net
- 100% coconut fiber matrix
- Functional longevity up to 36 months

# BioNet 100% Biodegradable ECBs

- Ideal for environmentally sensitive areas
- Reduced likelihood of wildlife entanglement
- Excellent for wetland, bioengineering, and forested sites
- Increased erosion control capabilities
- Provides greater cover than jute and coir nets

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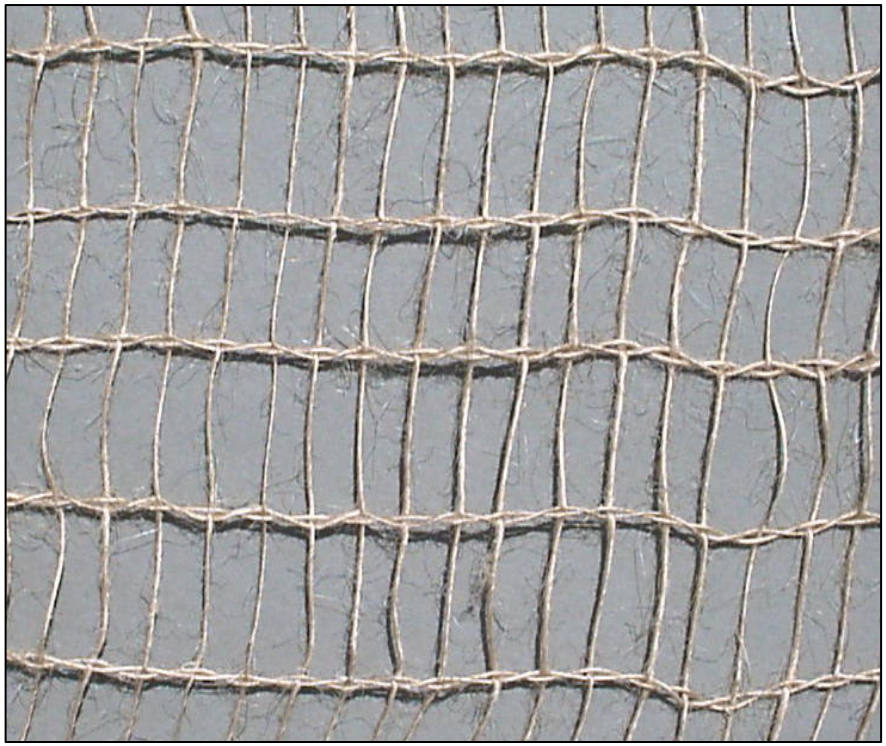
# Leno vs. Cross-Lay Weave Patterns

## Leno Woven Net



## Cross-Lay Net

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# BioNet

- 100% Natural materials, Leno woven top net
- 70% straw/30% coconut fiber matrix
- Functional longevity up to 18 months

Straw Coconut

# BioNet

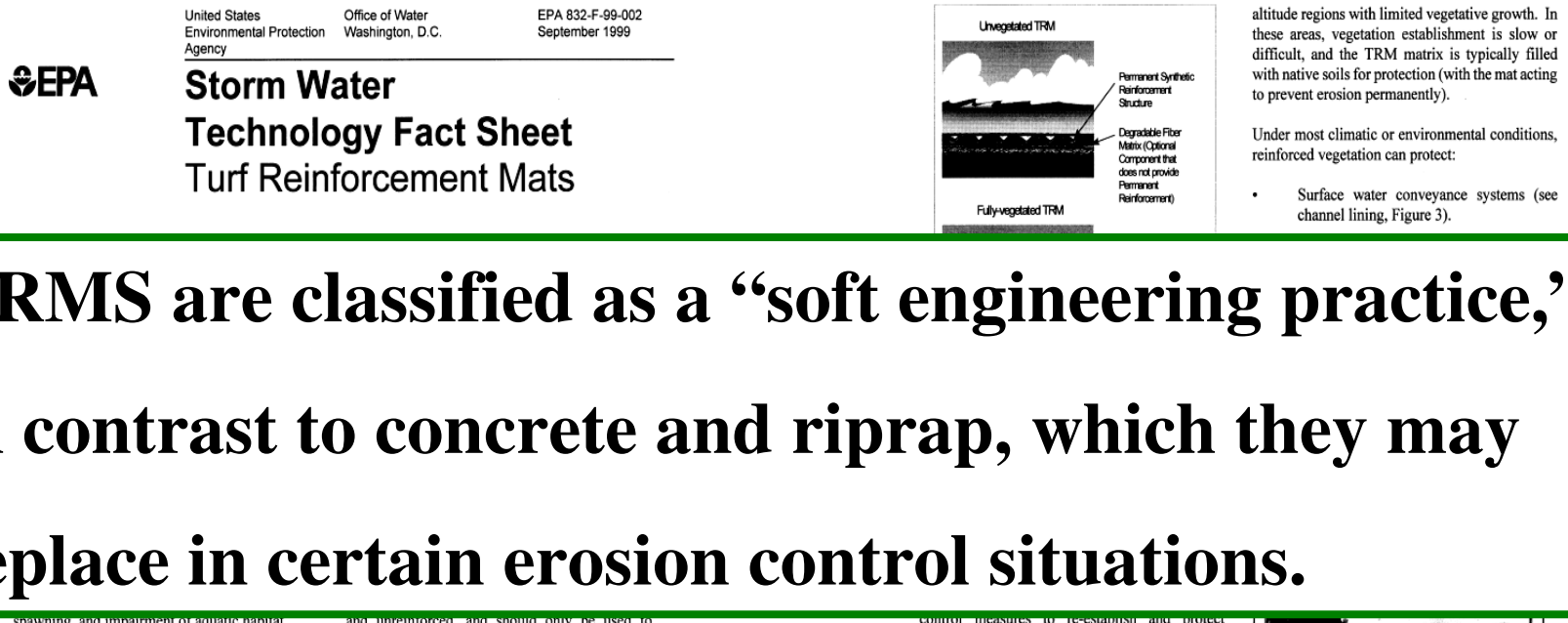
- 100% Natural Fiber material, Leno woven top net
- 100% coconut fiber matrix
- Functional longevity up to 24 months

Coconut

# Applications

# Turf Reinforcement Mat
# TRM's
# Permanent Turf Reinforcement

# Turf Reinforcement Mats (TRMs)



United States Environmental Protection Agency | Office of Water Washington, D.C. | EPA 832-F-99-002 September 1999

EPA

**Storm Water Technology Fact Sheet**
Turf Reinforcement Mats



altitude regions with limited vegetative growth. In these areas, vegetation establishment is slow or difficult, and the TRM matrix is typically filled with native soils for protection (with the mat acting to prevent erosion permanently).

Under most climatic or environmental conditions, reinforced vegetation can protect:

- Surface water conveyance systems (see channel lining, Figure 3).

**TRMS are classified as a "soft engineering practice," in contrast to concrete and riprap, which they may replace in certain erosion control situations.**

**TRMs combine vegetative growth and synthetic materials to form a high-strength mat that helps to prevent soil erosion in drainage areas and on steep slopes.**

# C-TRMs Extend The Use Of Vegetated BMPs – EPA Fact Sheets

United States Environmental Protection Agency | Office of Water Washington, D.C. | EPA 832-F-99-002 September 1999

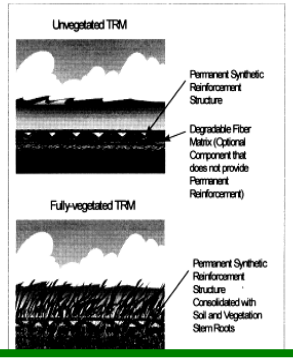
EPA

## Storm Water Technology Fact Sheet
Turf Reinforcement Mats

**DESCRIPTION**

This fact sheet describes the use of turf reinforcement mats (TRMs). TRMs combine

enhance vegetative root and stem development. By protecting the soil from scouring forces and enhancing vegetative growth, TRMs can raise the threshold of natural vegetation to withstand higher




altitude regions with limited vegetative growth. In these areas, vegetation establishment is slow or difficult, and the TRM matrix is typically filled with native soils for protection (with the mat acting to prevent erosion permanently).

Under most climatic or environmental conditions, reinforced vegetation can protect:

- Surface water conveyance systems (see channel lining, Figure 3).
- Surficial erosion of slopes.
- Pipe inlets and outlets.
- Shorelines and banks.

**TRMS can incorporate natural fiber materials to assist in establishing vegetation. However, the permanent reinforcement structure of TRMs is composed of entirely non-degradable synthetic materials.**

and polyvinyl chloride (PVC) netting, stitched together to form a three-dimensional matrix. They are thick and porous enough to allow for soil filling and retention. In addition to providing scour protection, the mesh netting of TRMs is designed to

specific soil and slope conditions.

Vegetative seed selection is based on the geographic region of the project and site specific concerns. Sources of information on seed selection

technology has been effectively used in both urban and rural areas and in a variety of climatic conditions. Although most effective when used in fully vegetated areas, TRMs have been used to prevent erosion even in arid, semi-arid, and high-

Source: Synthetic Industries, 1998.

**FIGURE 3 TRMs AS PROTECTIVE CHANNEL LININGS**

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# Traditional Methods of Permanent Erosion Control Technology


1969
And other less traditional...


1968
...forms of armor

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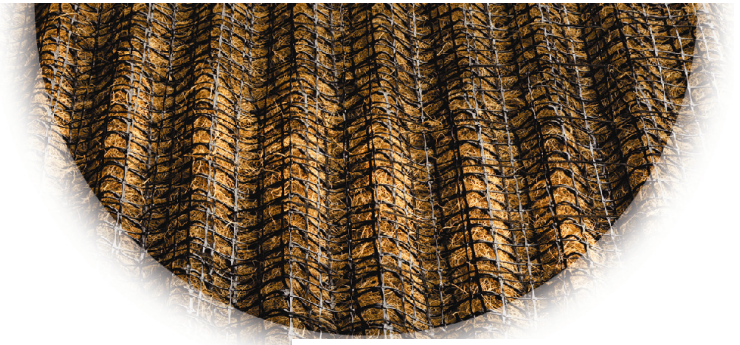
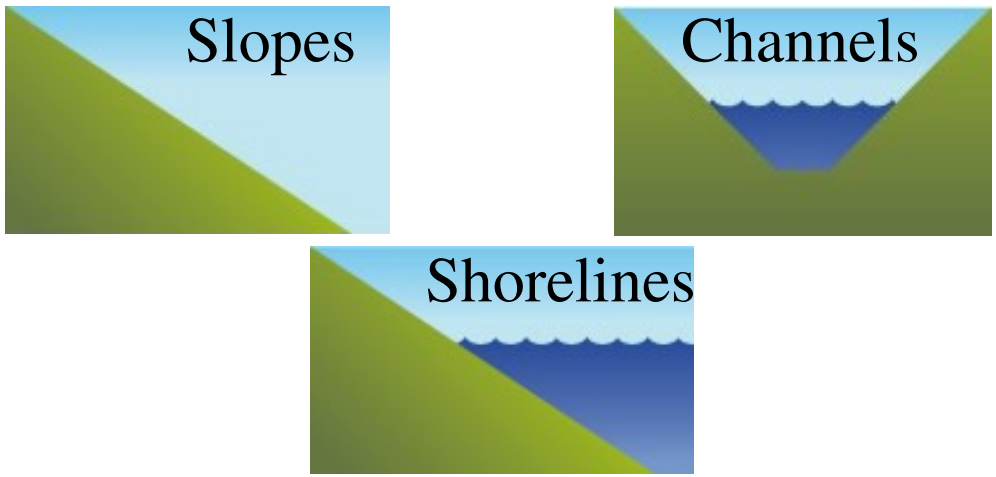
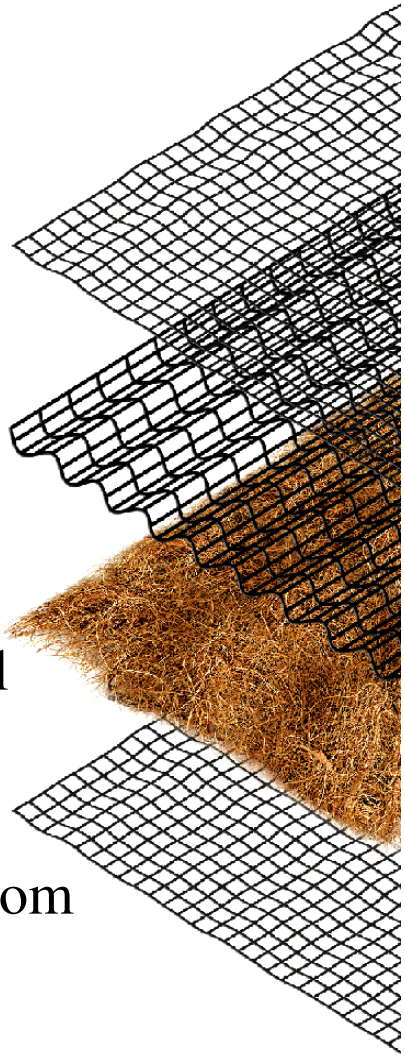


# Composition of TRMs

- 100% Fiber Matrix
- Protects Soil, Seed & Root Systems From Flowing Water



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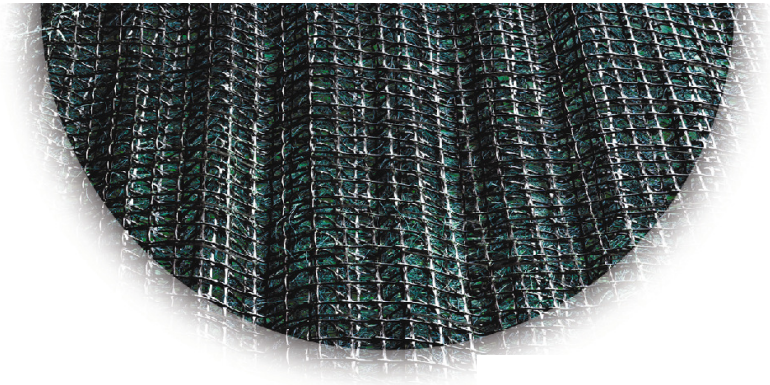
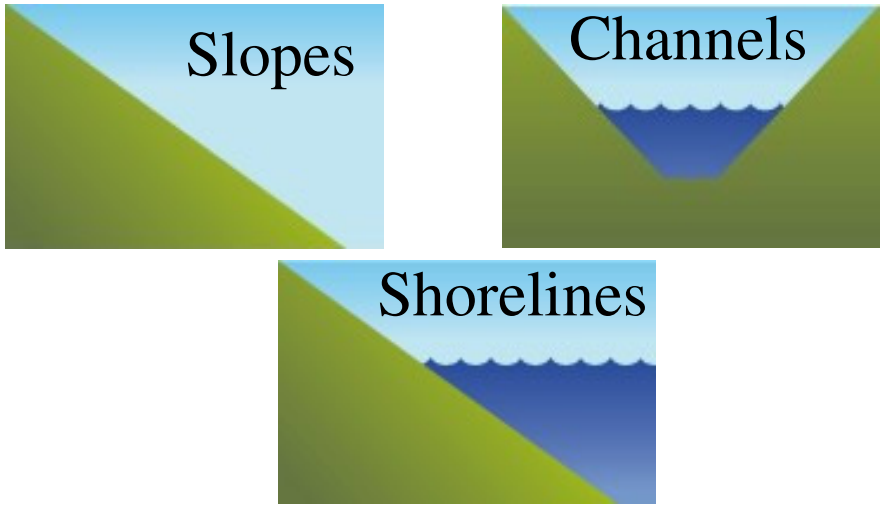
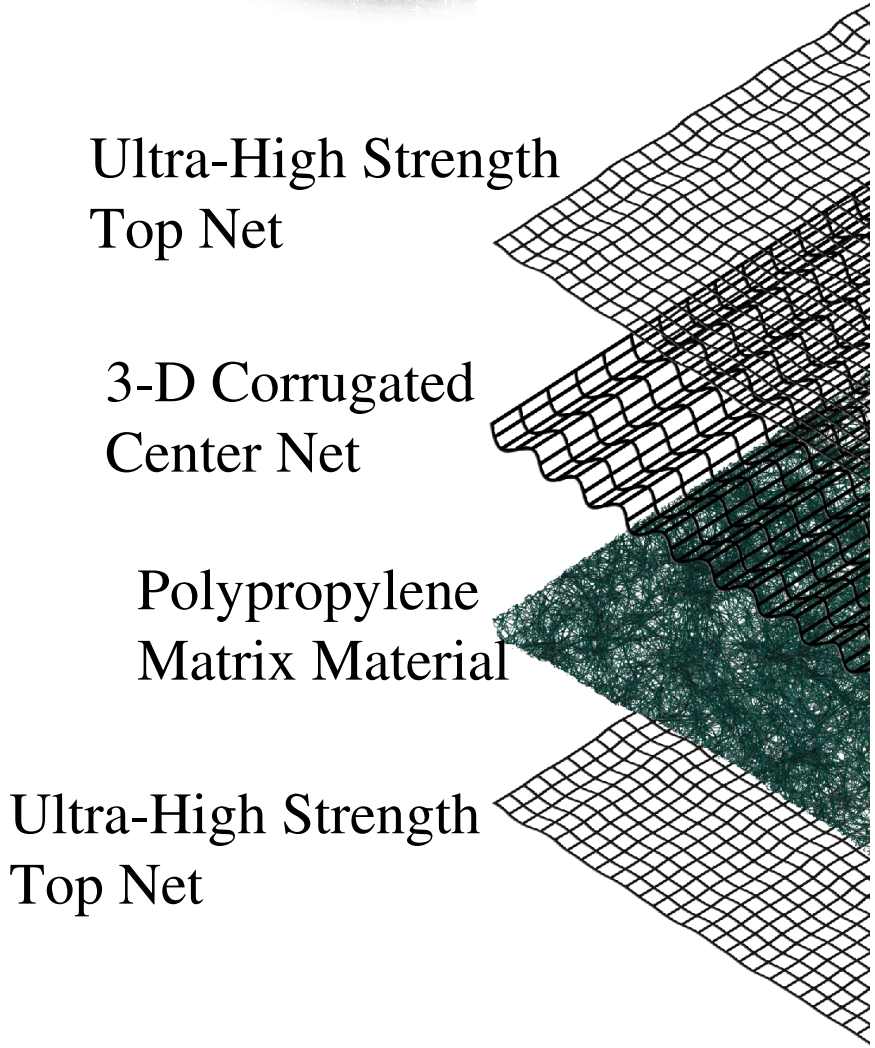


# Composition of TRMs

- Polypropylene Matrix Increases Permanent Vegetation Reinforcement
- Excellent for Shorelines
- Replacement for Rock and Concrete



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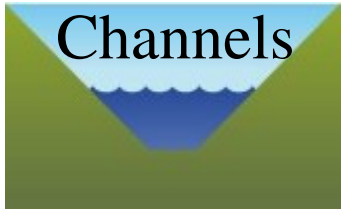



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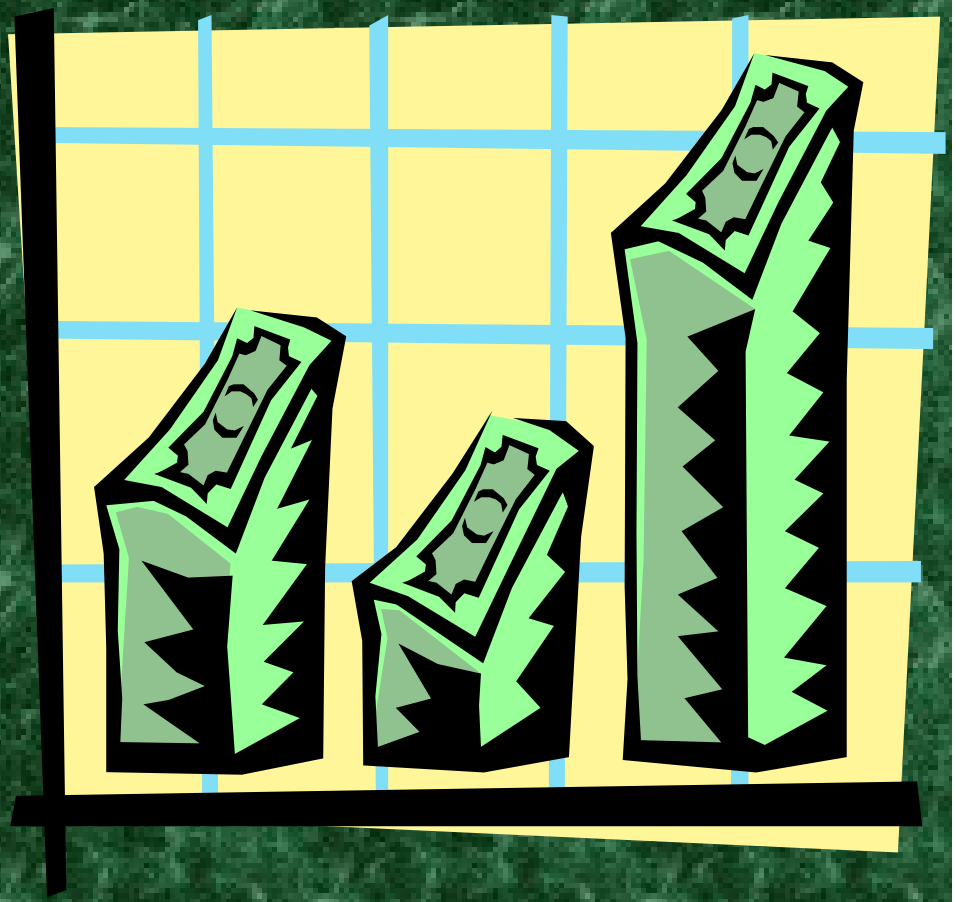
# Shorelines

# Shear Stress Comparison

| Material | Shear Stress (lbs/ft$^2$) |
|---|---|
| Blown Straw | 0.00 |
| Sod | 1.00 |
| Most Grasses | 3.67 |
| 4” Riprap | 1.33 |
| 8” Riprap | 2.67 |
| 24” Riprap | 8.00 |
| 36” Riprap | 10.00 |
| Turf Reinforcement Mat | **10.00 to 14.00** |

# ECONOMIC BENEFITS

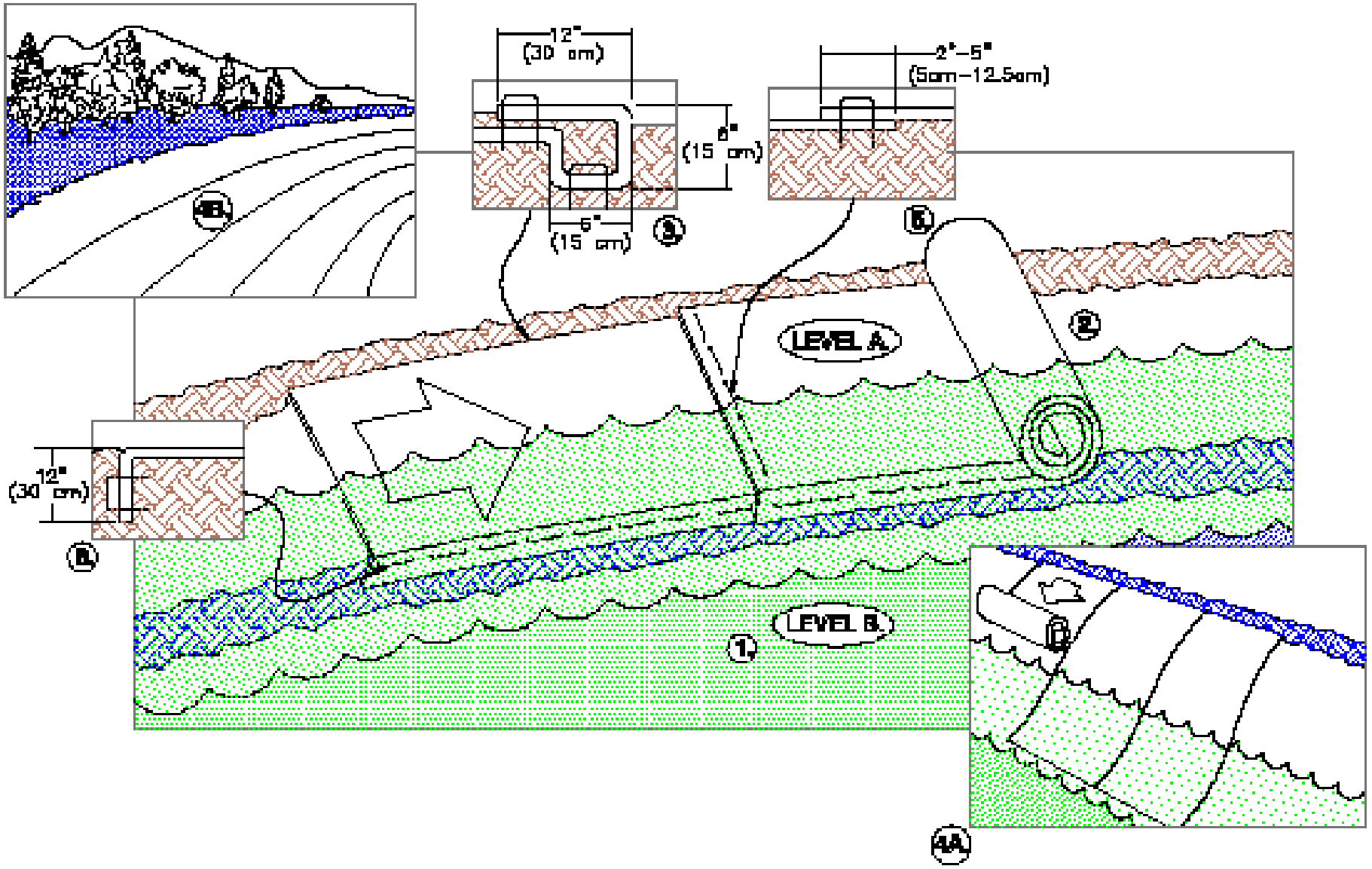
- **Up to 60% Savings Over Rock Riprap**
- **Less Expensive to Install Than Soil In-filled TRMs**



# Keys to Installation

- Intimate Soil Contact
- Proper Anchor Selection, Frequency, and Pattern DOT System
- Anchor Trenches and Termination Trenches
- Seedbed Preparation and Seeding

# Shoreline Installation



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# Rip Rap Issues

- Thermal Pollution
- Mineral Content
- Safety/Liability
- Those Darn Kids
- Cost
- Installation/Maintenance
- It’s Just Plain Ugly

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# TRM Properties

- Dimensional Stability, Mass, Thickness & Void-Space
- Permanent Components UV Stabilized
- Properties Balanced to Promote Growth & Reinforcement of Vegetation
- Greater Strength & Durability for More Extreme Applications

# How do TRMs Function?

- TRMs Extend the Performance Limits of Natural Vegetation By:
  - **Acting as an Artificial Root System**
  - **Retaining Soil Particles and Seeds**
  - **Accelerating Vegetative Development**
  - **Reinforcing the Vegetative Cover**
  - **Vegetation Improves Performance**

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# Hydro Mulches

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# What is Hydroseeding?

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# Hydromulching - Hydroseeding

- A process used to hydraulically apply mulch, seed and amendments, or any combination, by spraying (shooting) the solution, from a hose or cannon, in a water based slurry directly onto the soil surface.

# Hydromulching is a BMP that is used for Temporary or Permanent Seeding

- Armoring
  - Temporary protection for sites where vegetation is not needed
  - Protection for a few days up to several months
- Grassing
  - Used during final stages
  - of construction
  - Matrix used to help establish
  - vegetation

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# Temporary Seeding

# What Hydromulching is *Not*

- ***Not*** a permanent treatment, only temporary
  - Vegetation becomes permanent cover
- ***Not*** the "magic potion"
  - Requires suitable soils and seed mix
- One size does ***not*** fit all
  - Different mulches and additives do not all perform the same
- ***Not*** recommended to be used in concentrated flow areas by itself
  - May be used in conjunction with Rolled Erosion Control Blankets (RECBs)

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# Types of Hydraulic Mulches

- Paper
- Straw
- Paper and Wood Combination
- Wood
- Wood w/ Tac
- Wood w/ Synthetic Fibers
- Straw and Reclaimed Cotton Combination w/Tac

# Jet Agitated Machines


- Jet Agitated Machines use the force of water to suspend the slurry. They are limited to cellulose only.

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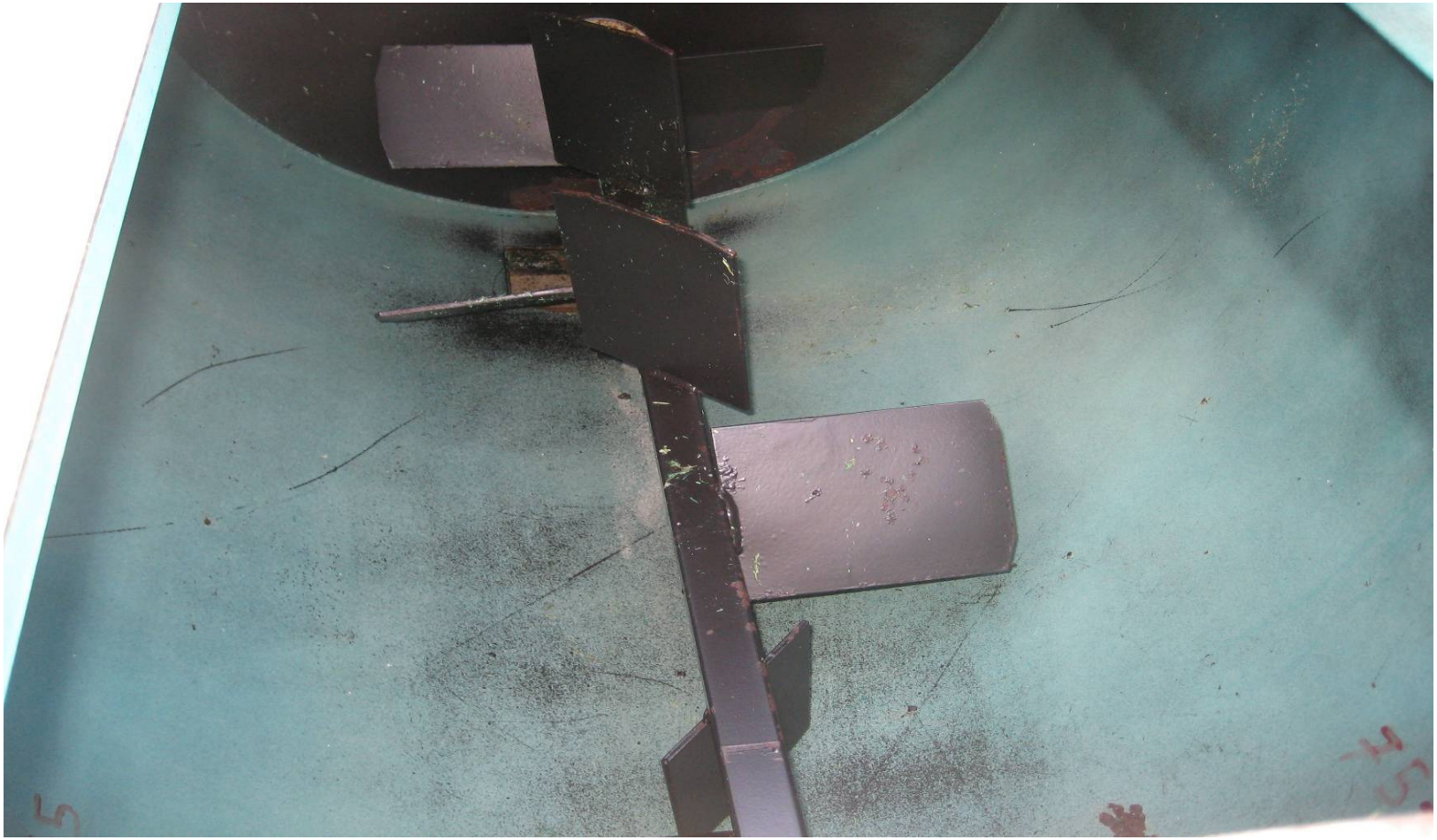
# Mechanical Agitation Only

Will not work in Jet Agitated Machines



# Nozzles

- Narrow Fan
- Wide Fan
- Long Distance

# Hydromulch can be administered by two methods

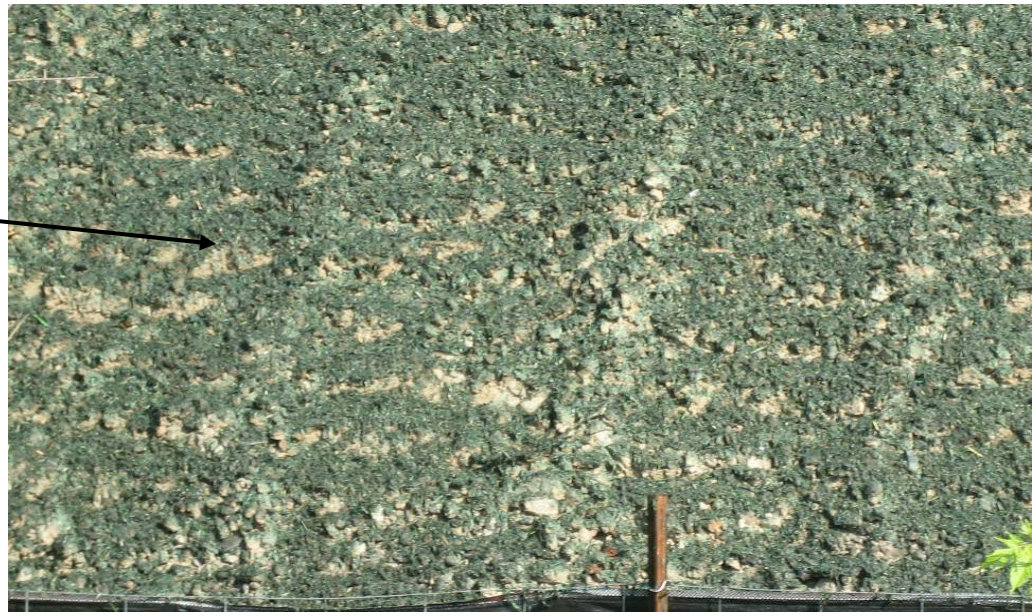
- Hose
  - This application is used in areas where precision in needed
- Cannon
  - This application is used for large areas where precision is not an issue.
  - Quicker method, usually preferred by applicators

# Be Sure of Complete Coverage

Apply Hydro Mulch from opposing directions to ensure complete coverage of all irregular soil surfaces

- If applied in only one direction ‘Shadowing’ may occur

**‘Shadowing’ can leave the underside unprotected and vulnerable to erosion**



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# Mixing Process

## 1 Step Process and 2 Step Process

- One Step Process – Seed, soil amendments, and mulch are applied simultaneously.
- Two Step Process – The application process where the seed and soil amendments are applied, then the hydromulch is applied secondly.

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# Conforms to Irregular Terrain

## Eliminates Fine grading – Installation Failures

# Slope Tracking is Optimal

# Reduced Site Preparation

# Ease of Installation

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# For Detailed Information on all of these products please contact your local Supplier or Manufacturer Representative

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# Thank You

# Questions